

COMPLETE LISTING OF THE CLAIMS

The following lists all of the claims that are or were in the above-identified patent application. The status identifiers respectively provided in parentheses following the claim numbers indicate the current statuses of the claims. In particular, claims having the status of "currently amended" are being amended in this reply.

1. (Currently Amended) A structure comprising:
an optoelectronic device;
a sub-mount containing electrical traces that are electrically connected to the optoelectronic device; and
~~a cap attached to the sub-mount so as to form a cavity enclosing the optoelectronic device, wherein the cap includes an optical element in a path of positioned to reflect an optical signal of the optoelectronic device between a path extending to the optoelectronic device and a path extending out of the structure.~~
2. (Original) The structure of claim 1, wherein the optoelectronic device comprises a side-emitting laser that emits the optical signal.
3. (Currently Amended) The structure of claim 2, wherein the optical element comprises a reflector positioned to reflect the optical signal from an initial direction to an output path that is substantially perpendicular to the initial direction.
4. (Original) The structure of claim 3, wherein the output path is through the sub-mount.
5. (Original) The structure of claim 3, wherein the reflector comprises a portion of a wall of the cavity.
6. (Original) The structure of claim 1, wherein the sub-mount further comprises:
internal bonding pads that are within the cavity and connected to the optoelectronic device; and
external bonding pads that electrically connect to the internal bonding pads and are accessible outside the cavity.
7. (Original) The structure of claim 1, wherein the sub-mount further comprises

active circuitry useful in operation of the optoelectronic device.

8. (Original) The structure of claim 1, wherein a bond of the cap to the sub-mount hermetically seals the cavity.

9. (Original) The structure of claim 8, wherein the optical element comprises a reflector on a portion of the walls of the cavity.

10. (Currently Amended) The structure of claim [[8]] 1, wherein the cap comprises a silicon substrate including a depression that forms walls of the cavity.

11. (Currently Amended) The structure of claim [[9]] 10, wherein the optical element comprises a portion of the walls that is along a <111> plane of the crystal structure of the silicon substrate.

12. (Currently Amended) A process comprising:
electrically connecting an optoelectronic device to a sub-mount;
fabricating a cap that includes an optical element; and
bonding the cap to the sub-mount, wherein the optoelectronic device is enclosed in a cavity between the sub-mount and the cap and an optical signal of the optoelectronic device is incident on the optical element and there reflected between a path extending to the optoelectronic device and a path extending out of the cavity.

13. (Original) The process of claim 12, wherein fabricating the cap comprises:
creating a depression in a substrate, the depression having walls that correspond to walls of the cavity; and
forming the optical element as a reflector corresponding to a reflective area on the walls of the depression.

14. (Original) The process of claim 13, wherein creating the depression comprises etching the substrate.

15. (Original) The process of claim 14, wherein the substrate comprises silicon, and the reflective area coincides with a <111> plane of a crystal structure of the silicon.

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16. (Original) The process of claim 13, wherein forming the optical element comprises coating at least a portion of the walls of the depression with a reflective material.

17. (Currently Amended) A process comprising:
electrically connecting a plurality of lasers respectively to a plurality of sub-mount areas of a first wafer, wherein each laser emits an optical signal;
fabricating a plurality of caps, wherein each cap includes an optical element;
bonding the caps to the first wafer, wherein the lasers are enclosed in respective cavities between the first wafer and the respective caps, and for each of the lasers, the optical element in the corresponding cap is positioned to receive and reflect the optical signal from the laser onto an output path from the cavity; and
dividing the resulting structure to separate a plurality of packages containing the lasers.

18. (Original) The process of claim 17, wherein the caps comprise respective areas of a second wafer, and bonding the caps to the wafer comprises bonding the second wafer to the first wafer.

19. (Original) The process of claim 18, wherein fabricating the caps comprises:
creating a plurality of depressions in the second wafer, wherein each depression has walls that correspond to walls of a corresponding one of the cavities; and
forming the optical elements as reflectors corresponding to reflective areas on the walls of respective depressions.

20. (Original) The process of claim 19, wherein the second wafer comprises silicon, and each of the reflective areas coincides with a <111> plane of a crystal structure of the silicon.

21. (New) A structure comprising:
an optoelectronic device;
a sub-mount containing electrical traces that are electrically connected to the optoelectronic device; and

a cap made of silicon that attached to the sub-mount to form a cavity enclosing the optoelectronic device, wherein the cap includes a reflector that is in a path of an optical

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signal of the optoelectronic device and on a cavity wall along a <111> plane of the crystal structure of the silicon.

22. (New) The structure of claim 21, wherein a bond of the cap to the sub-mount hermetically seals the cavity.

23. (New) The structure of claim 21, wherein the optoelectronic device comprises a side-emitting laser.

24. (New) The structure of claim 21, wherein the reflector directs the optical signal out of the structure in a direction that is perpendicular to a direction for which the optical signal emerges from the optoelectronic device.

25. (New) A process comprising:
electrically connecting an optoelectronic device to a sub-mount;
fabricating a cap by etching a silicon substrate to create a depression, and forming a reflective area on a wall of the depression that coincides with a <111> plane of a crystal structure of the silicon substrate; and
bonding the cap to the sub-mount, wherein the optoelectronic device is enclosed in the depression and an optical signal of the optoelectronic device is incident on the reflective area.

26. (New) The process of claim 25, wherein forming the reflective area comprises coating at least a portion of the wall of the depression with a reflective material.

27. (New) The process of claim 25, further comprising:
electrically connecting a plurality of optoelectronic devices to the sub-mount, wherein each of the optoelectronic devices emits an optical signal; and
etching a plurality of depressions in the silicon substrate, wherein each depression includes a reflective area, wherein
bonding the cap to the sub-mount comprises bonding the silicon substrate to the sub-mount so that the optoelectronic devices are between the sub-mount and the silicon substrate and are respectively enclosed in the depressions, and for each of the optoelectronic devices, the reflective area in the corresponding depression is positioned in a path of the optical signal from the optoelectronic device.

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28. (New) The process of claim 27, further comprising dividing a structure including the sub-mount and the silicon substrate to separate a plurality of packages respectively containing the optoelectronic devices.

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